Summary of Last Lecture

- Functional Dependency
  - Fully functionally dependent
  - Partially dependent
  - Transitive dependent

- Normalization
  - 1NF
    - a. domain should have atomic values
    - b. Single value in each attribute from the domain

Second Normal Form (2NF)

- A table is said to be in 2NF if the following conditions hold:
  - Table is in 1NF (First normal form)
  - No Partial Dependency
  - Every non-prime attribute should be functionally dependent on prime attribute.
- An attribute that is not part of any candidate key is known as non-prime attribute.

Second Normal Form (2NF) Cont..

Consider relation

R = {stu_name, course, ph_no, dept, grade }

F = { stu_name,course → grade,
stu_name → ph_no,
stu_name → dept }

Primary Key – stu_name,course

Is above relation in 2NF?

Second Normal Form (2NF) Cont..

R = {stu_name, course, ph_no, dept, grade }

Decompose using functional dependencies

such that all functional dependencies preserve.

R1 = {stu_name, ph_no, dept }

R2 = {stu_name, course, grade }

Second Normal Form (2NF) Cont..

R={manufacturer, model, model_name, manu_country}

F = {manufacturer, model → model_name,
manufacturer → manu_country }

Key = {manufacturer, model}

Is in 2NF?

Decompose -

R1 = {manufacturer, model, model_name}

R2 = {manufacturer, manu_country}

Third Normal Form (3NF)

- For a relation to be in Third Normal Form, it must satisfy following conditions :

  - It should be in Second Normal form
  - No non-prime attribute is transitively dependent on prime key attribute (no transitive dependency)

Third Normal Form (3NF) Cont..

R = {emp_id,emp_name,emp_zip,emp_city}

Key = {emp_id}

F = {emp_id → emp_name ,

emp_id → emp_zip,

emp_zip → emp_city }

Is the relation in 3NF ?

No, because of transitive dependency

emp_id → emp_zip → emp_city

Third Normal Form (3NF) Cont..

R = {emp_id,emp_name,emp_zip,emp_city}

Decompose using functional dependency

R1 = {emp_id,emp_name,emp_zip}

R2 = {emp_zip, emp_city}

Third Normal Form (3NF) Cont..

Example -

R = {course,prof,room,room_cap,enroll_limit}

Key = {course}

F = { course → prof,

course → room,

course → enroll_limit,

room → room_cap,

room → enroll_limit }

Is above relation in 3NF?

Third Normal Form (3NF) Cont..

R = {course, prof, room, room_cap, enroll_limit}

Key = {course}

Decompose using functional dependency

R1 = {course, prof, enroll_limit}

R2 = {room, room_cap}

R3 = {course, room}